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TSWS-29/75
21 July 1975

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WEEKLY SURVEYOR

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USSR AND EASTERN EUROPE

25X1 After ASTP the Soviets are expected to maintain their level of manned space activity for the next 4 years [redacted] 25X1 [redacted] 25X1 [redacted] 25X1 Even though NASA has no manned spaceflights scheduled, the Soviets are not expected to surpass the US level of competence. [redacted] 25X1 [redacted]

Budgetary pressures apparently have caused the Soviets to re-examine their overall CTR program. They have decided to concentrate on obtaining practical results sooner by limiting the size of their broad program and by concentrating on the development of a fission/fusion hybrid tokamak reactor. [redacted] 25X1 25X1 [redacted]

The Soviets have announced the completion and start-up of the T-10 tokamak. The completion of the T-10 was undoubtedly rushed so that the announcement of its completion could be made in Dubna at the IAEA conference on large tokamaks. [redacted] 25X1 25X1 [redacted]

A recent reference by A.M. Prokhorov to a 40-kJ Soviet laser probably refers to the "Mishen III" a neodymium glass laser planned for laser fusion research in 1977 or 1978. [redacted] 25X1 25X1

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WESTERN EUROPE

Price increases for uranium have made Sweden's vast low grade uranium deposits economical. Sweden may eventually be self sufficient in its uranium needs and may very well become a supplier of uranium to other countries.

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NUCLEAR ENERGY

Soviets Start Up T-10 Tokamak: The Soviets announced that the T-10 Tokamak was completed and put into operation on 29 June. The announcement stated that the T-10 was the largest thermonuclear installation in the world and that numerous organizations throughout the country had contributed to the planning, designing, assembly, and start-up of the T-10. As late as 25 April, Ye. P. Velikhov, the Deputy Director of Kurchatov IAE, stated that the T-10 was on schedule for operation in the fall of 1975 and for obtaining results from plasma experiments by the end of the year. Velikhov stated also that all apparatus for the T-10 would be in place in July and operations would begin in December. [redacted]

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Comment: The completion and start-up of the T-10 undoubtedly were rushed so that the maximum propaganda value could be obtained by an announcement at the IAEA conference on large Tokamaks being held in Dubna, 4 to 11 July. Although the device may have been operated as stated, it is probably not a viable research tool yet.

The T-10 is an important step in the Soviet fusion effort. Confinement studies on this device could be significant in establishing the feasibility of the Tokamak as a fusion reactor. The T-10 will be limited somewhat because it can be pulsed only every 40 minutes because of the coil design.

The US Princeton Large Torus (PLT) Tokamak, which is equivalent in size to the T-10, is scheduled for completion in the fall. In addition the PLT will use neutral beam heating of the plasma. [redacted]

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Budgetary Pressures Apparently Are Causing Concentration of Soviet CTR Efforts: Ye. P. Velikhov, Deputy Director of the Kurchatov IAE, recently alluded to budget problems which were creating pressure to demonstrate results in the Soviet controlled thermonuclear research (CTR) program. After high-level discussions on the future of the Soviet CTR programs, the Soviets have decided to end work on some of the small devices and to concentrate their

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money on Tokamaks, the T-20 in particular, to demonstrate the seriousness of their intent. The T-20, a large device costing 300 million rubles, is being developed as a prototype for a fission/fusion hybrid reactor. This hybrid is expected to breed four times as much plutonium per unit of energy production as a fast fission breeder reactor and to operate at a net energy gain. [redacted]

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Comment: Budgetary pressures apparently have caused the Soviets to re-examine their overall CTR program. They have decided to concentrate on obtaining practical results sooner by limiting the scope of their broad program and by concentrating on the development of a fission/fusion hybrid Tokamak reactor. Such a plan has two advantages. A hybrid is much more likely to achieve break-even and practical results before a pure fusion device. Also, a successful hybrid would eliminate the need for fast breeder reactors. The Soviets presently are having problems with their large breeder reactor.

It appears highly unlikely that the Soviets will have an operational hybrid reactor before 1985. This hybrid would need to rely on data from the T-10, T-20, and the US PLT Tokamaks. The T-10 has just become operational, the PLT is scheduled for the fall, and the T-20 is in the design stage. [redacted]

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Sweden to Increase Domestic Uranium Production: Sweden's only uranium concentrating plant plans to increase its current production of 120 metric tons of uranium oxide to 1,300 tons of uranium oxide per year by 1980. This will mean processing 6 million tons of ore per year. Molybdenum, vanadium and nickel also would be produced as by-products. [redacted]

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Comment: The Swedes possess vast quantities of uraniferous shales which contain very small amounts of uranium. Heretofore only token quantities of uranium were produced because the cost was two to three times as much as the world market price of uranium ($10 per pound). The world market price has increased drastically with some future delivery contracts now being signed for as much as $22 per pound. The Swedish deposits, therefore, have become economical to mine and process. [redacted]

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SPACE

Soviets Will Dominate Manned Spaceflight for the Next 4 Years: The Soviets are not slowing down their manned space effort after the Apollo-Soyuz Test Project (ASTP), scheduled for launch on 15 July, according to General Thomas G. Stafford, command pilot for the Apollo portion of the ASTP flight. Soviet space officials have stated that they plan to launch several manned spaceflights per year following ASTP. By contrast, the US is not scheduled for another manned flight until 1980. [redacted] [redacted]

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Comment: The Soviet comments are consistent with recent Soviet manned space activities. [redacted] The Soviet manned spaceflights have included both scientific and military earth orbital missions. Both types of missions are expected to continue at the present pace, i.e., several per year. Mission durations and total man-days in orbit per year probably will increase. The introduction of a new larger ferry vehicle to replace the Soyuz in the next few years could increase dramatically the number of cosmonauts the Soviets put into space. Even with this level of activity the Soviets are not expected to surpass the level of competence achieved by NASA.

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Reference to Soviet 40-kJ Laser Probably Refers to 1977 Device for Laser Fusion System: During a discussion of possible US/USSR cooperation in laser fusion, A. M. Prokhorov stated that there are just two aspects of laser work which are classified: the energy output level of lasers and the "pellets." He also disclosed that the Soviet state-of-art is about same as that of the US and mentioned 40 kJ as the current output. [redacted]

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Comment: Prokhorov probably was not referring to a currently existing system, but to the "Mishen III", a 40-kJ nanosecond pulse laser system planned for 1977 or 1978. Plans for this system were revealed for the first time at a recent conference where it was described as a rectangular glass slab laser system intended for laser pellet implosion research. If Prokhorovs' remark does refer to this device, his statement regarding classification is puzzling.

The US has a 10-kJ, 100-picosecond pulse glass laser system for fusion, called Shiva, planned for installation

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at Lawerence Livermore Laboratory in 1978. The US and USSR laser fusion systems generally will be comparable, considering their respective energy outputs and pulse durations. Shorter pulse systems are less efficient in energy output.

The achievement of a single pulse 40-kJ laser with any lasing medium is significant for laser fusion or laser weapons R&D.

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